DOCUMENT RESUME

ED 159 070 SE 024 939

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TITLE Pest Control in Corn and Soybeans: Weeds - Insects - Diseases.
INSTITUTION Wisconsin Univ., Madison, Univ. Extension.
PUB DATE Jan 74
NOTE 30p.; Not available in hard copy due to colored pages throughout entire document

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS Agricultural Chemical Occupations; Agricultural Education; *Corn (Field Crop); *Disease Control; *Field Crops; Herbicides; Insecticides; *Pesticides; Science Education
IDENTIFIERS *Soybeans

ABSTRACT

This document gives the characteristics and application rates for herbicides used to control annual weeds in corn, annual and perennial broadleaf weeds in corn, quackgrass and yellow nutsedge in corn, and annual weeds in soybeans. It also gives insecticide use information for corn and soybeans. A brief discussion of disease control in corn and soybeans is also included. Finally, information is given on calibrating and cleaning sprayers and granular applicators and on safe pesticide use. (BB)

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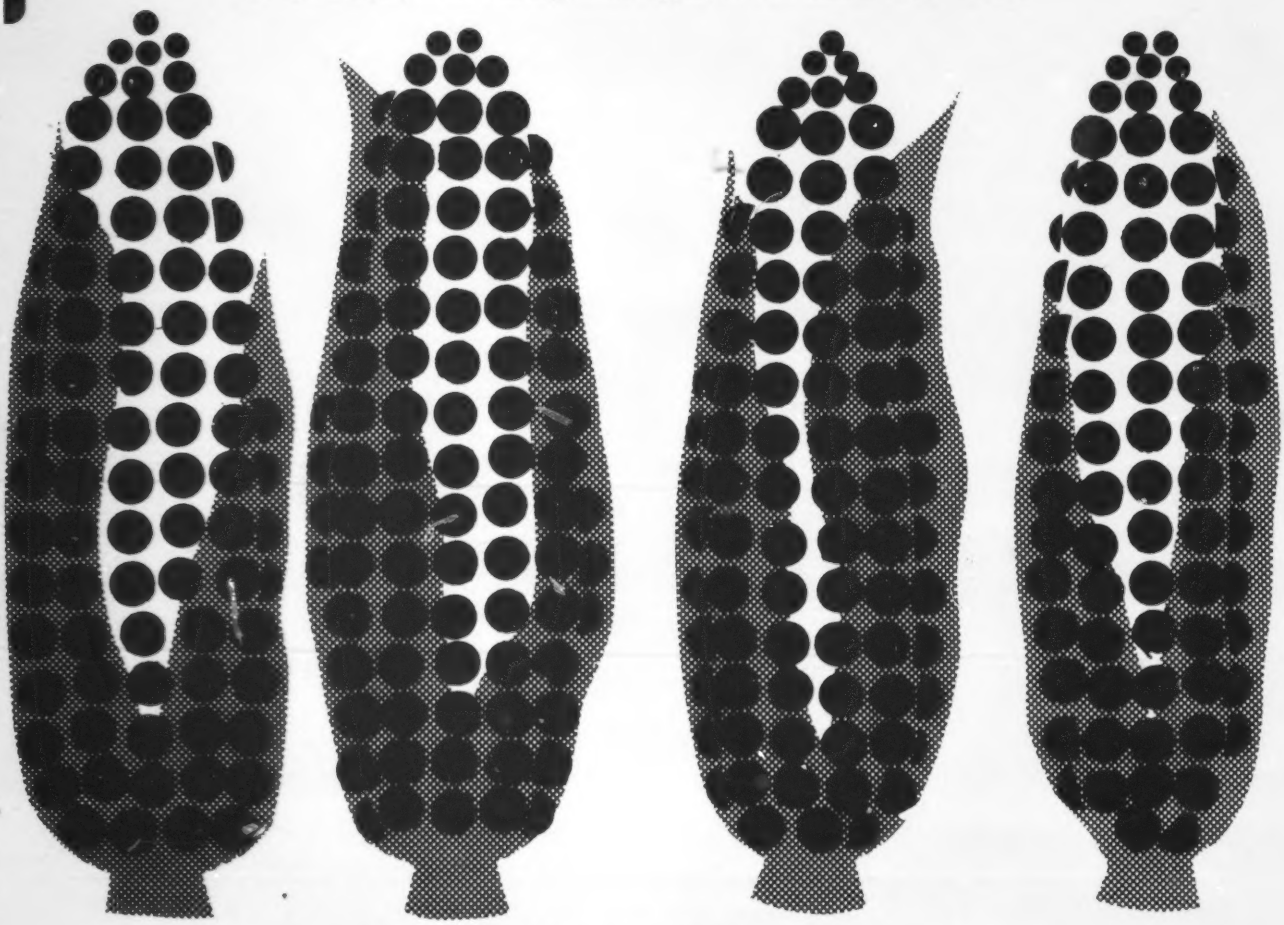
PEST CONTROL IN CORN AND SOYBEANS

WEEDS - INSECTS - DISEASES

R. E. Doersch, R. G. Harvey, J. W. Apple, E. H. Fisher and G. L. Worf



COOPERATIVE EXTENSION PROGRAMS
UWEX University of Wisconsin–Extension
University of Wisconsin–Madison

SE 024 939

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Efficient agricultural production requires adequate control of weeds, insects and diseases. Pesticides are essential to sound crop management but cultural pest control practices also play an important role.

The effectiveness of pesticide treatments is determined by weather conditions, time, rate and method of pesticide application, type of tillage system, how well the treatment is matched to the pest problem and soil situation plus a variety of other factors. Proper consideration of all these factors is essential for maximizing the benefits of a pesticide treatment.

WEED CONTROL

Chemical weed control with herbicides is an asset to sound crop management. But no herbicide treatment provides guaranteed weed control. Supplementary cultivation will maximize the effectiveness of an herbicide treatment. Use crop rotation, clean seed and feed, and other good cultural practices to help control weeds.

SELECTING A WEED CONTROL PROGRAM

Plan weed control programs for corn and soybean production well in advance of the planting season. Base your program on thorough knowledge of the weed problem, soil characteristics and future cropping plans.

Herbicides vary in the type of plants they control. Some herbicide treatments provide good control of many broadleaf and grassy weeds. Others provide excellent control of grasses but control only some broadleaf weeds.

Time of herbicide application can also be critical. Some herbicides must be applied after planting but before the crop emerges (preemergence). They may kill the crop or fail to control weeds if applied after the crop emerges (postemergence). Others you must apply before planting and immediately incorporate into the soil (preplant-incorporated). They may not provide weed control if applied to the soil surface after planting.

Soil characteristics affect herbicide performance and crop safety. Many soil-applied herbicides are less effective on soils high in organic matter and are almost totally ineffective on peat and muck soils. Other herbicides should not be used on light-textured sandy soils, since they leach too readily and may damage crop seedlings. Some herbicides remain in the soil into the next cropping season and injure sensitive crops. Be sure to consider the residual characteristics of the herbicide if you plan to plant a different crop the next season.

A good weed control program must be flexible. Change weed control practices according to the situation to gain the most satisfactory returns for your weed control efforts.

WEATHER EFFECTS ON HERBICIDES

Weather conditions influence the result of herbicide treatments. Herbicides applied to the soil are taken up by seeds, roots and stems of seedling weeds and established perennial plants. Dry weather slows the movement of surface-applied herbicides into the soil and thereby reduces or delays weed control. You may apply some herbicides before planting by mixing them into the soil during seedbed preparation. This minimizes the need for rainfall to make the herbicide effective. Only certain herbicides can be used in this way; others become too diluted when mixed into the soil.

Rapid weed seed germination is desirable when using soil-applied herbicide treatments. Adequate rainfall increases the effectiveness of soil-applied herbicides because it favors the germination of weed seeds. However, excessive rainfall after herbicide application may leach the more soluble herbicides into the vicinity of germinating crop seeds where they do injury. Dry soil conditions and cool soil temperatures slow the breakdown of herbicides by chemical and microbial decomposition. They also reduce the leaching of herbicides into the soil. Reduced breakdown increases the danger that herbicide residue may carry over and injure sensitive crops the following year.

Herbicides applied to plant foliage (postemergence) are even more affected by weather conditions. The sensitivity of both weeds and crop plants generally increases with temperature. Lower herbicide application rates are sometimes suggested in hot, humid weather to minimize crop injury. Weeds are more difficult to kill in dry, cool, cloudy weather. Mature weeds are always more difficult to control than weed seedlings. Rainfall after postemergence application generally doesn't reduce the herbicide's effectiveness if the spray has had time to dry on the plant foliage. For some postemergence treatments, rainfall shortly after application may be quite desirable.

PREEMERGENCE VS. POSTEMERGENCE TREATMENT

Herbicide application to corn fields after weeds emerge has gained in popularity since atrazine-oil treatments were introduced. Weed control with this treatment is drastically influenced by weather conditions and the type of weeds present. Under favorable weather conditions, sensitive broadleaf weeds are dramatically controlled. However, grass control may be poor and corn injury may occur with unfavorable weather conditions.

Postemergence-applied herbicides are exposed to the atmosphere, so temperature, moisture and other factors cause variation in weed control. With preplant or preemergence applied herbicides, the soil gives some insulation to this climatic variation. For this reason, preplant and preemergence treatments provide consistently better weed control than postemergence treatments. Sometimes corn and soybean growers cannot use the preferred preplant or preemergence weed control options and must use postemergence-applied herbicides to salvage corn and soybean crops. However, a well-planned weed control program should rely heavily on preplant and preemergence herbicide alternatives.

When using postemergence-applied atrazine for weed control in corn, use an additive to increase the effectiveness of the treatment on leaves. Oil additives, oil-surfactant mixtures, and oil-wetting agent combinations formulated specifically for use with atrazine are best. Commercial surfactants specifically for use with pesticides also increase the effectiveness of postemergence atrazine applications but don't aid in the burndown of annual grasses as much as the previous additives. Commercial liquid cleaners and general wetting agents are the least satisfactory additives.

BAND VS. BROADCAST TREATMENT

Choosing between an overall broadcast herbicide treatment and a band spray over crop rows depends upon the type and cost of herbicide treatment, the particular weed problem and the availability of labor. Herbicides you apply and soil-incorporate before planting aren't suited to band application. Perennial weeds like quackgrass compete very vigorously with row crops and aren't adequately controlled with band treatment. Row cultivation is essential when using band treatment.

In Wisconsin, the proper time for the first cultivation with row treatment frequently coincides with the ideal time for legume forage harvest. Because of demands on time and equipment, most corn and soybean growers who harvest substantial amounts of legume forage have gone to broadcast treatment. This approach delays the row cultivation schedule and frequently eliminates the need for cultivation. Band treatment requires 1/3 to 1/2 as much herbicide as does broadcast treatment, depending upon row and band width. The relatively high cost of some herbicides relative to potential crop yield and profit has led some growers to choose band treatment.

HERBICIDE RESIDUES IN SOIL

Growers who have had herbicide carryover damage to sensitive crops may find all soil herbicide residue objectionable. But most herbicides control weeds only as long as they persist in the soil. Full season weed control is considered desirable in any herbicide treatment. Only soil herbicide residue which persists into the following growing season and causes damage to that crop is objectionable.

Following a few simple rules will reduce risk of herbicide residue damage. Always use the minimum rate necessary for adequate weed control and do a uniform job of application. Treated fields should always be plowed before planting a sensitive crop the next year. At equal rates of the same herbicide, preplant or preemergence applications present less risk of carryover than postemergence applications. The earlier treatment has more time to break down. Crops vary in their tolerance to carryover of herbicides such as AAtrex. If possible, select a crop which has a high degree of tolerance to the previous year's herbicide treatment. Several years of herbicide use experience on a particular soil are an excellent guide to which crops you can safely plant the year after atrazine application. Fortunately, only AAtrex, Princep and Treflan present significant residue carryover problems to corn and soybean growers.

IS CULTIVATION NECESSARY?

Advertising for some herbicides leaves the impression that their use eliminates the need for row cultivation. However, even the best herbicide treatment doesn't provide consistently good weed control each year. Weather conditions vary from year to year and soil conditions vary from place to place. Weed control with herbicides varies accordingly. In those years and those soil conditions where herbicide performance is unsatisfactory, you may use a rotary hoe or row cultivator to good advantage. A cultivation preceded by a partially effective treatment is of more value than a cultivation without prior herbicide treatment. A crusted soil surface due to compaction by heavy rains may also need some tillage.

HERBICIDES AND MINIMUM TILLAGE

Weed problems are generally more critical in minimum tillage crop production than in conventional systems. But conventional weed control treatments don't provide suitable weed control in all minimum tillage corn and soybean production situations. The availability of an adequate weed control program should help you decide whether to use a minimum tillage system.

Conventional weed control treatments fit quite well into minimum tillage methods which include some plowing. However, in no-till systems conventional weed control recommendations are less applicable, so consider a specific program for each minimum tillage variation. Few specific weed control alternatives for various types of minimum tillage production are presently available. However, industry and university research is attempting to develop improved weed control practices for minimum tillage crop production.

HERBICIDE MIXTURES

In recent years, combining two herbicides for simultaneous application has become quite popular. Many such combinations have been registered for use. Some are marketed in a single package. The objective of mixing two herbicides is to capitalize on the advantages of both products while diminishing the disadvantages. The recommendations which follow describe several combination treatments for corn and soybeans that provide superior weed control. All these combinations are presently registered for use by the Environmental Protection Agency. Other combinations are being examined experimentally and may be registered in the future. By using unregistered herbicide combinations you risk having possible illegal herbicide residues in the harvested crop, potential crop injury, or ineffective weed control.

When mixing wettable powder herbicides with emulsifiable concentrate herbicides, mix the wettable powder with the water or liquid fertilizer first. Then add water or liquid fertilizer until you've reached approximately 75 percent of the total spray volume you'll use. Add the emulsifiable concentrate last and then bring the mixture to final spray volume.

Herbicide application in liquid fertilizer solutions rather than water is also gaining popularity. This practice generally doesn't improve weed control but does save one trip across the field. Many herbicides and even herbicide combinations are registered with the EPA for simultaneous application with liquid fertilizers. Herbicide labels and accompanying literature indicate whether a particular herbicide can be used in this way. Directions frequently specify mixing procedures or the addition of compatibility agents to aid in forming a uniform spray mixture. Wettable powder preparations generally mix quite well with liquid fertilizers. Emulsifiable concentrates occasionally cause mixing problems.

Simultaneous application of herbicides and insecticides has generally not worked satisfactorily.

Annual Weed Control in Corn

The following herbicide treatments have provided superior annual weed control in corn under Wisconsin conditions. Their relative characteristics are indicated in Table 1 (page 11). Locate the conditions which best match your local situation in the table. Then select the herbicide and application rate that best control the specific weeds in your corn fields. All herbicide rates are expressed in weight or volume of commercial product as applied on a broadcast basis.

AATREX

Preplant-incorporated: Apply 2 1/2 to 3 3/4 lbs/A of AAtrex 80W or 2 to 3 qts/A of AAtrex 4L within two weeks before planting, working the herbicide into the soil during seedbed preparation. Lesser rates become too dilute with soil incorporation. Where soil organic matter exceeds 4 percent (40 T/A) or giant foxtail is a problem, use the maximum rate plus cultivation. Preplant-applied AAtrex provides better velvetleaf control than preemergence treatment and can be mixed with liquid fertilizer for simultaneous application. It also provides some quackgrass suppression but isn't as good as preplow treatment. Preplant-applied AAtrex provides little or no control of crabgrass and fall panicum and is usually ineffective on peat or muck soils. Soil residue of AAtrex may injure sensitive crops the following year. In dry seasons, preplant-incorporated treatment provides better annual weed control than preemergence treatment.

Preemergence: Apply 2 1/2 to 3 3/4 lbs/A of AAtrex 80W or 2 to 3 qts/A of AAtrex 4L after planting before annual weeds emerge. Lesser rates are sometimes adequate on light soils or under light weed infestations. But foxtails generally escape at lower rates. Use the maximum rate plus cultivation where giant foxtail is a problem or where soil organic matter exceeds 4 percent (40 T/A). This treatment has some effect on quackgrass but doesn't provide economical control. Preemergence-applied AAtrex provides little or no control of crabgrass and fall panicum and is usually totally ineffective on peat or muck soils. It can be mixed with liquid fertilizer for simultaneous application. Soil residue of AAtrex may injure sensitive crops the following year.

Postemergence: Apply 2 to 2 1/2 lbs/A of AAtrex 80W or 1.6 to 2 qts/A of AAtrex 4L plus an appropriate quantity of an effective spray oil additive, oil-surfactant mixture, or oil-wetting agent combination after weed emergence but before weeds are more than 1 1/2 inches tall. This treatment often fails to control annual grasses. If only annual broadleaf weeds are a problem, apply 1 1/2 lbs/A of AAtrex 80W or 1.4 qts/A of AAtrex 4L plus an effective oil-base additive. The oil-base spray additive hastens weed burndown but can also cause marginal leaf burn and occasional corn stunting. Straight surfactants, wetting agents or liquid cleaners are generally less effective than oil-base additives. Do not include 2,4-D or Banvel in this spray mixture--corn may be seriously injured. This treatment provides some quackgrass suppression but isn't as good as preplow treatment. Postemergence-applied AAtrex provides little or no control of crabgrass and fall panicum. Soil residue of AAtrex may injure sensitive crops the following year.

BLADEX

Preemergence: Apply 2 to 4 lbs/A of Bladex 80 after planting before annual weeds emerge. On soils with low to medium clay content, apply 1 lb/A for each 1 percent (10 T/A) of soil organic matter. And apply 1 1/4 lb/A for each 1 percent of soil organic matter on soil with high clay content. Corn injury generally isn't a problem except where heavy rainfall follows application. But don't use Bladex on sands or loamy sands with less than 1 percent of soil organic matter. Bladex generally provides better foxtail, crabgrass, and fall panicum control than AAtrex but it misses some velvetleaf and redroot pigweed. It provides little or no control of quackgrass and is usually totally ineffective on peat or muck soils. Bladex presents no risk of soil residue carryover and can be mixed with liquid fertilizer for simultaneous application. Bladex 15G is a 15 percent granular product which is as effective as Bladex 80.

SUTAN+/AATREX

Preplant-incorporated: Apply 1/2 to 2/3 gal/A of Sutan + 6E plus 1 1/4 to 2 lbs/A of AAtrex 80W to dry soil within two weeks before planting and immediately incorporate 2 to 3 inches deep with a disk, working first lengthwise and then crosswise. Weed control depends on immediate and thorough incorporation. Vary the Sutan + rate depending on the severity of the annual grass problem and use the maximum rate of AAtrex where soil organic matter exceeds 4 percent (40 T/A). This combination provides excellent control of foxtails, crabgrass, and fall panicum but has little effect on quackgrass and is usually totally ineffective on peat and muck soils. Sutan + contains a safening agent which essentially eliminates risk of corn damage. You can mix these herbicides with liquid fertilizer for simultaneous application. The Sutan +/AAtrex combination presents less risk of soil residue damage to sensitive crops the following year than where a comparable rate of atrazine is used.

LASSO/AATREX

Preplant-incorporated: Apply 2 1/2 qts/A of Lasso plus 1 1/4 to 2 lbs/A of AAtrex 80W to dry soil within one week before planting, incorporating the herbicide into the soil during seedbed preparation. Use the maximum rate of AAtrex where soil organic matter exceeds 4 percent (40 T/A). Some velvetleaf may escape this treatment. This combination provides excellent control of foxtails, crabgrass, and fall panicum but has little effect on quackgrass and is usually totally ineffective on peat and muck soils. Corn injury generally isn't a problem unless corn is planted too deep or soil becomes crusted. These herbicides may be mixed with liquid fertilizer for simultaneous application. The Lasso/AAtrex combination presents less risk of soil residue damage to sensitive crops the following year than where a comparable rate of atrazine is used. In dry seasons, preplant-incorporated treatment provides better weed control than preemergence treatment.

Preemergence: Apply 2 to 2 1/2 qts/A of Lasso plus 1 1/4 to 2 lbs/A of AAtrex 80W after planting before weeds emerge. Vary the Lasso rate depending on the severity of the annual grass problem and use the maximum rate of AAtrex where soil organic matter exceeds 4 percent (40 T/A). Some velvetleaf generally escapes, especially in dry seasons. This combination provides excellent control of foxtails, crabgrass, and fall panicum but has little effect on quackgrass and is usually totally ineffective on peat and muck soils. Corn injury generally isn't a problem unless corn is planted too deep or soil becomes crusted. These herbicides may be mixed with liquid fertilizer for simultaneous application. The Lasso/AAtrex combination presents less risk of soil residue damage to sensitive crops the following year than where a comparable rate of atrazine is used. You may use this treatment as a delayed preemergence application when corn is no more than 5 inches tall and before weeds are past the two-leaf stage. But it's most effective when applied before weeds emerge.

LASSO/BLADEX

Preemergence: Apply 2 qts/A of Lasso plus 1 1/2 to 2 1/4 lbs/A of Bladex 80 after planting before weeds emerge. Vary the Bladex rate depending on soil organic matter and clay content. Corn injury from these herbicides isn't too likely under normal weather conditions. But don't use this combination on sands or loamy sands with less than 1 percent (10 T/A) of soil organic matter. This combination provides excellent control of foxtails, crabgrass, and fall panicum but generally fails to control velvetleaf. It has no effect on quackgrass and is usually totally ineffective on peat or muck soils. These herbicides may be mixed with liquid fertilizer for simultaneous application. Preemergence-applied Lasso/Bladex presents no risk of soil residue carryover.

PRINCEP/AATREX

Preemergence: Apply 1 1/4 to 1 7/8 lbs/A of Princep 80W plus 1 1/4 to 1 7/8 lbs/A of AAtrex 80W after planting before annual weeds emerge. Lesser rates are sometimes adequate on light soils or under light weed infestations. But foxtails generally escape at lower rates. Use the maximum rate plus cultivation where giant foxtail is a problem or where soil organic matter exceeds 4 percent (40 T/A). This treatment has some effect on quackgrass but doesn't provide economical control. It does provide slightly better control of foxtails, crabgrass, and fall panicum than a comparable rate of atrazine. Both Princep and AAtrex are usually ineffective on peat or muck soils. You may mix these herbicides with liquid fertilizer for simultaneous application. Soil residue of both Princep and AAtrex may injure sensitive crops the following year.

LASSO/LOROX

Preemergence: Apply 2 qts/A of Lasso plus 1 1/2 to 2 1/2/ lbs/A of Lorox after planting, before corn emerges. Vary the Lorox rate depending on soil texture and organic matter content. Plant corn no less than 1 3/4 inches deep to minimize risk of corn injury. But don't use this combination on sands, loamy sands, or soils with less than 1 percent (10 T/A) of soil organic matter. Some velvetleaf may escape this treatment. This combination provides excellent control of foxtails, crabgrass, and fall panicum but fails to control quackgrass and is usually totally ineffective on peat or muck soils. These herbicides may be mixed with liquid fertilizer for simultaneous application. Preemergence-applied Lasso/Lorox presents no risk of soil residue carryover.

LASSO/BROMEX

Preemergence: Apply 2 qts/A of Lasso plus 2 to 3 lbs/A of Bromex 50WP after planting before corn emerges. Vary the Bromex rate depending on soil texture and organic matter content. Plant corn no less than 1 3/4 inches deep to minimize risk of corn injury. But don't use this combination on sands, loamy sands, or soils with less than 1 percent (10 T/A) of soil organic matter. Some velvetleaf may escape this treatment. This combination provides excellent control of foxtails, crabgrass, and fall panicum but fails to control quackgrass and is usually totally ineffective on peat or muck soils. These herbicides may be mixed with liquid fertilizer for simultaneous application. Preemergence-applied Lasso/Bromex presents no risk of soil residue carryover.

SUTAN+

Preplant-incorporated: Apply 1/2 to 2/3 gal/A of Sutan + 6E to dry soil within two weeks before planting and incorporate 2 to 3 inches deep with a disk, working first lengthwise and then crosswise. Weed control depends on immediate and thorough incorporation. Vary the rate depending on the severity of the annual grass problem. This herbicide provides excellent control of foxtails, crabgrass, and fall panicum but controls only selected broadleaf annual weeds. Followup treatment for broadleaf weed control is usually necessary. It has no effect on quackgrass and is usually totally ineffective on peat or muck soils. Sutan + contains a safening agent which essentially eliminates risk of corn damage. Sutan+ presents no risk of soil residue carryover and can be mixed with liquid fertilizer for simultaneous application.

ERADICANE

Preplant-incorporated: Apply 2/3 gal/A of Eradicane to dry soil within two weeks before planting and incorporate 2 to 3 inches deep with a disk, working first lengthwise and then crosswise. Weed control depends on immediate and thorough incorporation. Eradicane provides excellent control of foxtails, crabgrass, and fall panicum but controls only selected broadleaf annual weeds. Followup treatment for broadleaf weed control is usually necessary. It has little effect on quackgrass at this application rate and is usually totally ineffective on peat or muck soils. Eradicane contains a safening agent which essentially eliminates risk of corn damage. Eradicane presents no risk of soil residue carryover and can be mixed with liquid fertilizer for simultaneous application. It is the best alternative available for wild cane control in corn.

LASSO

Preplant-incorporated: Apply 2 1/2 to 3 qts/A of Lasso to dry soil within one week before planting, incorporating the herbicide into the soil during seedbed preparation. Vary rate depending on the severity of the annual grass problem. Lasso provides excellent control of foxtails, crabgrass, and fall panicum but has no effect on quackgrass. It also fails to control velvetleaf and several other broadleaf annual weeds. Followup treatment for broadleaf weed control is usually necessary. Corn injury generally isn't a problem unless corn is planted too deep or soil becomes crusted. Lasso presents no risk of soil residue carryover. It may be mixed with liquid fertilizer for simultaneous application. In dry seasons, preplant-incorporated treatment provides better annual weed control than preemergence treatment.

Preemergence: Apply 2 to 2 1/2 qts/A of Lasso after planting before weeds emerge. Vary rate depending on the severity of the annual grass problem. Lasso provides excellent control of foxtails, crabgrass, and fall panicum but has no effect on quackgrass. It also fails to control velvetleaf and several other broadleaf annual weeds. Followup treatment for broadleaf weed control is usually necessary. Corn injury generally isn't a problem unless corn is planted too deep or soil becomes crusted. Lasso presents no risk of soil residue carryover. It may be mixed with liquid fertilizer for simultaneous application. Lasso II is a 15 percent granular product which is as effective as liquid Lasso.

Annual and Perennial Broadleaf Weed Control in Corn

The following herbicide treatments control only broadleaf weeds. They are generally used in conjunction with an effective grass control treatment or in situations where broadleaf weeds are the primary problem. The effectiveness of these treatments depends upon weather conditions and the susceptibility of specific broadleaf weeds to the herbicide.

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2, 4-D AMINE OR ESTER

Broadcast postemergence: Apply 1/2 to 1 pt/A of 2, 4-D amine or 1/3 to 2/3 pt/A of 2, 4-D ester when corn is 4 to 8 inches tall. Rate suggestions refer to preparations containing 4 lbs of acid equiv/gal. Use the lower rate for treatment in hot, humid weather and treat sweet corn before it is more than 6 inches tall. Stalk brittleness may occur--do not cultivate for at least one week after treatment. Do not combine 2, 4-D with spray oil or AAtrex or more serious corn injury may occur.

Drop-nozzle postemergence: Apply 1/2 pt/A of 2, 4-D amine or ester when corn is 12 or more inches tall. Rate suggestions refer to preparations containing 4 lbs of acid equiv/gal. Direct the spray toward the base of the corn row to obtain maximum weed coverage with minimum corn injury. Stalk brittleness may occur--do not cultivate for at least one week after treatment. Do not combine 2, 4-D with spray oil or AAtrex or more serious corn injury may occur.

BANVEL

Broadcast postemergence: Apply 1/4 to 1/2 pt/A of Banvel when corn is 4 to 12 inches tall. Use the lower rate on two inch weeds and higher rates on taller weeds. Banvel is especially effective on smartweed and Canada thistle but less effective than 2, 4-D on mustards and velvetleaf. Corn injury is less likely than with 2, 4-D. Don't combine Banvel with spray oil or AAtrex or more serious corn injury may occur. Avoid spray drift onto sensitive crops such as soybeans, alfalfa, vegetables and tobacco.

Drop-nozzle postemergence: Apply that proportion of the above rate which corresponds to the fraction of the row area treated. Do not apply to corn more than 36 inches tall or later than 10 days before tassel emergence. Other specifics outlined for broadcast application also apply to this treatment.

BANVEL/2, 4-D

Broadcast postemergence: Apply 1/4 pt/A of Banvel plus 1/2 pt/A of 2, 4-D amine when corn is 4 to 8 inches tall. This combination provides better broadleaf weed control than either 2, 4-D or Banvel alone. Follow precautions as when applying 2, 4-D or Banvel alone.

Quackgrass Control in Corn

Since quackgrass is a persistent perennial weed, control procedures differ from those previously outlined for annual weed control. For best results, apply quackgrass control herbicides before the cropping season. This approach weakens vigorous quackgrass growth and minimizes its competition with the growing corn crop.

AATREX

Preplow application: Apply 2 1/2 lbs/A of AAtrex 80W or 2 qts/A of AAtrex 4L to quackgrass sod in late summer or fall at least two weeks before freezeup or before plowing in early spring when quackgrass is three or more inches tall. With fall application, quackgrass kill is improved by digging just before freeze-up to leave the soil surface rough during winter. You may plow in fall or delay until spring. With spring application, delay plowing for 10 to 14 days after AAtrex application. Applications on fields covered with manure or plant debris are less effective. Apply an additional 2 1/2 lbs/A of AAtrex 80W or 2 qts/A of AAtrex 4L at corn planting time to complete quackgrass kill. The second application will also provide annual weed

control. Plant corn for two years after this split application. Two cultivations can be substituted for the second AAtrex treatment to reduce herbicide cost and decrease risk of soil residue carryover. AAtrex is usually ineffective on peat or muck soils. But you can mix it with liquid fertilizer for simultaneous application.

DOWPON OR DOWPON M

Preplow application: Apply 10 lbs/A of Dowpon or Dowpon M to quackgrass sod in early fall when green quackgrass shoots are 2 to 8 inches tall. Dowpon M is a new formulation containing the same concentration of dalapon as Dowpon. Begin intermittent quack-digging two weeks after treatment and continue until freeze-up. Plow in late fall or spring. Apply 2 1/2 lbs/A of AAtrex 80W or 2 qts/A of AAtrex 4L at corn planting time to control annual weeds and aid in quackgrass control. Soil residue of atrazine may injure sensitive crops the following year.

Yellow Nutsedge Control in Corn

Yellow nutsedge (nutgrass) is a perennial weed which has become a serious problem in many corn fields. It reproduces by both seeds and underground nutlets. Nutsedge most frequently occurs on peat or muck soils. Many herbicide treatments lose their effectiveness on such soils. The following herbicide treatments offer some nutsedge control but research continues in order to find better methods of nutsedge control.

AATREX

Preplant-incorporated: Use on mineral soils only--ineffective on peat or muck soils. Apply 5 lbs/A of AAtrex 80W or 4 qts/A of AAtrex 4L within two weeks before planting, incorporating the herbicide into the soil during seedbed preparation. Control drops off rapidly with rate reductions. Soil residue will persist into the following year--plant corn for two consecutive years.

Postemergence: Apply 2 1/2 lbs/A of AAtrex 80W or 2 qts/A of AAtrex 4L plus an appropriate quantity of an effective oil-base additive within three weeks after planting when nutsedge seedlings are 2 to 3 inches tall. Control drops off rapidly with rate reduction and higher rates increase risk of corn injury. Cultivate and repeat this treatment in several weeks if the nutsedge infestation warrants it. Surfactant, wetting agent, and liquid cleaner additives have not proven as effective as oil-base additives for increasing the effectiveness of postemergence-applied AAtrex. This treatment controls nutsedge on mineral soils and is also one of the better herbicide possibilities for nutsedge control on peats and mucks. Soil residue may injure sensitive crops the following year. Consider the total amount of AAtrex used when selecting next year's crop.

LASSO

Preplant-incorporated: Apply 3 to 4 qts/A of Lasso to dry soil within one week before planting and incorporate into the soil during seedbed preparation. More effective on peat or muck soils than other soil treatments for nutsedge control. Cultivate and follow this treatment with a postemergence AAtrex/oil application if the nutsedge infestation warrants it.

SUTAN+

Preplant-incorporated: Use on mineral soils only--ineffective on peat or muck soils. Apply 2/3 gal/A of Sutan+ 6E to dry soil within two weeks before planting and immediately incorporate 2 to 3 inches deep with a disk, working first lengthwise and then crosswise. Weed control depends on immediate and thorough incorporation. Cultivate and follow this treatment with a postemergence AAtrex/oil application if the nutsedge infestation warrants it.

ERADICANE

Preplant-incorporated: Use on mineral soils only--ineffective on peat or muck soils. Apply 2/3 gal/A of Eradicane to dry soil within two weeks before planting and immediately incorporate 2 to 3 inches deep with a disk, working first lengthwise and then crosswise. Weed control depends on immediate and thorough incorporation. Eradicane controls nutsedge somewhat more effectively than Sutan + 6E. But followup cultivation and/or postemergence AAtrex/oil treatment may still be necessary to aid in nutsedge control.

TABLE 1. EFFECTIVENESS OF HERBICIDE TREATMENTS FOR ANNUAL WEED CONTROL IN CORN IN 1974

Herbicide Treatment	Velvetleaf control	Other annual broadleaf control	Foxtail control	Crabgrass & fall panicum control	Quackgrass suppression	Risk of corn injury	Risk of residue carryover	Cleared for sweet corn
AATREX								
preplant-incorporate	Excellent	Excellent	Fair	Poor	Good	None	Moderate	Yes
preemergence	Good	Excellent	Fair	Poor	Fair	None	Moderate	Yes
BLADEX								
preemergence	Poor	Good	Very Good	Very Good	None	Very Slight	None	Yes
LASSO								
preplant-incorporate	Poor	Fair	Very Good	Very Good	None	Very Slight	None	Yes
preemergence	Poor	Fair	Excellent	Excellent	None	Very Slight	None	Yes
ERADICANE								
preplant-incorporate	Fair	Fair	Excellent	Excellent	None	None	None	No
SUTAN+								
preplant-incorporate	Fair	Fair	Excellent	Excellent	None	None	None	Yes
LASSO/AATREX								
preplant-incorporate	Fair	Excellent	Very Good	Very Good	Poor	Very Slight	Slight	Yes
preemergence	Fair	Excellent	Excellent	Excellent	Poor	Very Slight	Slight	Yes
LASSO/BLADEX								
preemergence	Poor	Excellent	Excellent	Excellent	None	Very Slight	None	No
SUTAN+/AATREX								
preplant-incorporate	Good	Excellent	Excellent	Excellent	Poor	None	Slight	Yes
PRINCEP/AATREX								
preemergence	Good	Excellent	Good	Good	Fair	None	Moderate	Yes
LASSO/LOROX								
preemergence	Fair	Excellent	Excellent	Excellent	None	Moderate	None	No
LASSO/BROMEX								
preemergence	Fair	Excellent	Excellent	Excellent	None	Moderate	None	No
AATREX-OIL (conventional rates)								
postemergence	Excellent	Excellent	Fair	Poor	Good	Slight	Moderate	Yes
AATREX-OIL (low rates)								
postemergence	Excellent	Excellent	Poor	Poor	Poor	Very Slight	Slight	Yes
2,4-D								
postemergence	Good	Good	None	None	None	Moderate	None	Yes
BANVEL								
postemergence	Fair	Good	None	None	None	Slight	None	No
BANVEL/ 2,4-D								
postemergence	Good	Excellent	None	None	None	Moderate	None	No

Characteristics outlined are based on application rates appropriately matched to soil texture, organic matter and weed problems.

Annual Weed Control in Soybeans

The following herbicide treatments have provided superior annual weed control in soybeans under Wisconsin conditions. Their relative characteristics are indicated on Table 2, p. 15. Locate the conditions which best match your local situation in the table. Then select the proper herbicide and appropriate application rate to best control these specific weeds in your soybean fields. All herbicide rates are expressed in weight or volume of commercial product as applied on a broadcast basis. Perennial weeds such as quackgrass, Canada thistle, nutsedge, etc. in soybeans cannot be effectively controlled with any of these herbicide treatments. These weeds must be controlled with appropriate weed control practices the year before soybeans are planted.

AMIBEN

Preemergence: Apply 1 to 1 1/2 gal/A of Amiben after planting but before soybeans emerge. Use the lower rate on light sandy soils low in organic matter only. If no rainfall occurs within 3 to 5 days after application, incorporate the herbicide into the soil with a rotary hoe or spike-toothed harrow. Amiben controls most annual weeds except wild mustard, cocklebur and black nightshade. Slight soybean stunting may occur if heavy rainfall follows herbicide application. This herbicide is more effective than many others on soils with 5 to 10 percent (50 - 100 T/A) of soil organic matter but it's ineffective on peat or muck soils. A 10 percent granular Amiben product is as effective as liquid Amiben.

LOROX

Preemergence: Apply 3 to 4 lbs/A of Lorox after planting before soybeans emerge. Follow label directions for rate adjustments on lighter and darker soils. Plant soybeans no less than 1 3/4 inches deep to minimize risk of soybean damage. Soybean stand reduction may occur on lighter soils or where heavy rainfall follows application. Don't use Lorox on sands, loamy sands, or soils with less than 1 percent (10 T/A) of soil organic matter. Lorox is usually ineffective on peat or muck soils. Don't use Lorox on fields where you anticipate a significant AAtrex carryover problem from the previous year. Combined effects of atrazine residual and Lorox can cause more serious soybean damage.

TREFLAN

Preplant-incorporated: Apply 1/2 to 1 qt/A of Treflan EC within 10 weeks before planting, incorporating it into the soil with a disk within 8 hours after application. Incorporate thoroughly, working first lengthwise and then crosswise. Follow label directions for rate adjustments on lighter or darker soils. Use lowest rate only on soils very low in organic matter. Velvetleaf, mustard, ragweed, smartweed, cocklebur and black nightshade aren't controlled. Treflan is usually ineffective on peat or muck soils. Soybean injury doesn't appear a serious problem except when applied to wet soil or in areas subject to prolonged flooding. Plow treated fields before planting the next year to minimize risk of Treflan carry over damage to sensitive crops.

LASSO

Preplant-incorporated: Apply 2 1/2 to 3 qts/A of Lasso to dry soil within one week before planting, incorporating it into the soil during seedbed preparation. Vary rate depending on the severity of the annual grass problem. Lasso provides excellent control of foxtails and other annual grasses but fails to control velvetleaf and several other broadleaf annual weeds. It provides better annual weed control on peat or muck soils than other herbicides but tends to leach out of irrigated sandy soils quite rapidly.

Preemergence: Apply 2 to 2 1/2 qts/A of Lasso after planting before soybeans emerge. Vary rates depending on the severity of the annual grass problem. Lasso provides excellent control of foxtails and other annual grasses but fails to control velvetleaf and several other broadleaf annual weeds. It provides better annual weed control on peat or muck soils than other herbicides but tends to leach out of irrigated sandy soils quite rapidly. Lasso II is a 15 percent granular product which is as effective as liquid Lasso.

LASSO/LOROX

Preemergence: Apply 2 qts/A of Lasso plus half the normally suggested rate of Lorox after planting before soybeans emerge. Follow label directions for rate adjustments on lighter and darker soils. Plant soybeans no less than 1 3/4 inches deep to minimize risk of soybean damage. Soybean stand reduction may occur on lighter soils or where heavy rainfall follows application. Don't use this treatment on sands, loamy sands, or soils with less than 1 percent (10 T/A) of organic matter. This treatment is usually ineffective on peat or muck soils. Use

caution on fields where you anticipate significant AAtrex carryover from the previous year. Combined effects of atrazine residual and Lorox can cause more serious soybean damage.

LASSO/BROMEX OR LASSO/MALORAN

Preemergence: Apply 2 qts/A of Lasso plus 2 to 3 lbs/A of either Bromex 50WP or Maloran 50WP after planting before soybeans emerge. Bromex and Maloran are the same herbicide from two different manufacturers. Follow label directions for rate adjustments on lighter and darker soils. Plant soybeans no less than 1 3/4 inches deep to minimize risk of soybean damage. Soybean stand reduction may occur on lighter soils or where heavy rainfall follows application. Don't use this treatment on sands, loamy sands, or soils with less than 1 percent (10 T/A) of organic matter. This treatment is usually ineffective on peat or muck soils. Use caution on fields where you anticipate significant AAtrex carryover from the previous year. Combined effects of atrazine residual and Bromex or Maloran can cause more serious soybean damage.

LASSO/SENCOR

Preemergence: Apply 2 qts/A of Lasso plus 3/4 lb/A of Sencor 50WP after planting before soybeans emerge. Check label directions for additional rate suggestions. Plant soybeans no less than 1 1/2 inches deep to minimize risk of soybean damage. Soybean stand reduction may occur on lighter soils or where heavy rainfall follows application. Don't use this treatment on sands, or on sandy loams or loamy sands with less than 2 percent (20 T/A) organic matter or where soil pH is greater than 7.4. This treatment is usually ineffective on peat or muck soils. Use caution on fields where you anticipate significant AAtrex carryover from the previous year. Combined effects of atrazine residual and Sencor can cause more serious soybean damage. Sencor controls annual broadleaf weeds missed by Lasso. But it also presents significant risk of soybean injury related to minor variations in soil and environmental conditions. Limit your use of this treatment until we gain more extensive experience with it.

TREFLAN/AMIBEN (SPLIT TREATMENT)

Preplant-incorporated plus preemergence: Apply 1/2 to 1 qt/A of Treflan EC within 10 weeks before planting. Incorporate it into the soil with a disk within 8 hours after application. Incorporate thoroughly working first lengthwise and then crosswise. Plant soybeans. Then apply 1 gal/A of Amiben or a comparable rate of Amiben granules before soybeans emerge. Preemergence Amiben treatment controls annual broadleaf weeds that normally escape preplant-incorporated Treflan treatment. Treflan controls annual grasses.

TREFLAN/LOROX (SPLIT TREATMENT)

Preplant-incorporated plus preemergence: Apply 1/2 to 1 qt/A of Treflan EC within 10 weeks before planting. Incorporate it into the soil with a disk within 8 hours after application. Incorporate thoroughly, working first lengthwise and then crosswise. Plant soybeans. Then apply Lorox at 1/2 the normal suggested rate before soybeans emerge. Be sure soybeans are planted no less than 1 3/4 inches deep to minimize risk of soybean damage. Soybean stand reduction may occur on lighter soils or where heavy rainfall follows Lorox application. Don't use Lorox on sands, loamy sands, or soils with less than 1 percent (10 T/A) of organic matter. These herbicides are usually ineffective on peat or muck soils. Use caution on fields where you anticipate significant AAtrex carryover from the previous year. Combined effects of atrazine residual and Lorox can cause more serious soybean damage.

TREFLAN/SENCOR (SPLIT TREATMENT)

Preplant-incorporated plus preemergence: Apply 1/2 to 1 qt/A of Treflan EC within 10 weeks before planting. Incorporate it into the soil with a disk within 8 hours after application. Incorporate thoroughly working first lengthwise and then crosswise. Plant soybeans. Then apply 3/4 lb/A of Sencor 50WP before soybeans emerge. Be sure soybeans are planted no less than 1 1/2 inches deep to minimize risk of soybean damage. Soybean stand reduction may occur on lighter soils or where heavy rainfall follows Sencor application. Don't use Sencor on sands, or on sandy loams or loamy sands with less than 2 percent (20T/A) of soil organic matter or where soil pH is greater than 7.4 These herbicides are usually ineffective on peat or muck soils. Use caution on fields where you anticipate significant AAtrex carryover from the previous year. Combined effects of atrazine residual and Sencor can cause more serious soybean damage. Preemergence Sencor treatment controls annual broadleaf weeds that normally escape preplant-incorporated Treflan treatment. Treflan controls annual grasses. But Sencor also presents significant risk of soybean injury related to minor variations in soil and environmental conditions. Limit use of this split treatment until we gain more extensive experience with it.

Common and Trademarked Names of Herbicides Used on Corn and Soybeans

Trademarked Name	Common Name
AAtrex 80W	atrazine
AAtrex 4L	atrazine
Amiben	chloramben
Banvel	dicamba
Bladex 15G	cyanazine
Bladex 80	cyanazine
Bromex 50WP	chlorbromuron
Dowpon	dalapon
Dowpon M	dalapon
Eradicane	EPTC + safener
Lasso	alachlor
Lasso II	alachlor
Lorox	linuron
Maloran 50WP	chlorbromuron
Princep 80W	simazine
Sencor	metribuzin
Sutan +	butylate + safener
Treflan	trifluralin
(variety of trademarked names)	2, 4-D amine
(variety of trademarked names)	2, 4-D ester

TABLE 2. EFFECTIVENESS OF HERBICIDE TREATMENTS FOR ANNUAL WEED CONTROL IN SOYBEANS IN 1974

Herbicide treatment	Redroot pigweed control	Common ragweed control	Lambs-quarter control	Smart-weed control	Velvet-leaf control	Cockle-bur control	Black nightshade control	Foxtail control	Risk of soybean injury
AMIBEN									
preemergence	V. Good	V. Good	Good	V. Good	Good	Poor	Good	Good	V. slight
LOROX									
preemergence	Excell	Excell	Excell	V. Good	V. Good	Fair	V. Good	Fair	Moderate
LASSO									
preplant-incorp	V. Good	Good	Fair	Fair	Poor	Poor	Excell	Excell	None
preemergence	V. Good	Good	Fair	Fair	Poor	Poor	Excell	Excell	None
TREFLAN									
preplant-incorp	Good	Poor	Good	Poor	Poor	Poor	Poor	Excell	V. slight
LASSO/LOROX									
preemergence	Excell	Excell	Excell	V. Good	V. Good	Fair	Excell	Excell	Slight
LASSO/MALORAN									
preemergence	Excell	Excell	Excell	V. Good	V. Good	Fair	Excell	Excell	Slight
LASSO/BROMEX									
preemergence	Excell	Excell	Excell	V. Good	V. Good	Fair	Excell	Excell	Slight
LASSO/SENCOR									
preemergence	Excell	Excell	Excell	V. Good	V. Good	Good	Excell	Excell	Slight
TREFLAN/LOROX									
split treatment	Excell	Excell	Excell	V. Good	V. Good	Fair	V. Good	Excell	Slight
TREFLAN/AMIBEN									
split treatment	V. Good	V. Good	Good	V. Good	Good	Poor	Good	Excell	V. slight
TREFLAN/SENCOR									
split treatment	Excell	Excell	Excell	V. Good	V. Good	Good	Poor	Excell	Slight

Characteristics outlined are based on application rates appropriately matched to soil texture, organic matter and weed problems.

INSECT CONTROL

Proper and safe insecticide use requires great care and strict adherence to the most current label directions. Check current University of Wisconsin-Extension literature for changes or additions in control procedures. Insecticides help control insect pests. But they can also kill beneficial insects such as bees. Warn nearby beekeepers before using insecticides, and only apply insecticides between 4:00 pm and nightfall when bees are least likely to be exposed.

Consult publications A2047 (Corn Insects Below Ground) and A2046 (Corn Insects Above Ground) to aid in identifying these pests.

FIGURING INSECTICIDE DOSAGE

1) Per acre dosage given here are amounts of actual chemical or active ingredient, not the liquid, powder, or granular formulation.
2) The label of a liquid formulation shows the number of pounds of actual insecticide per gallon of the concentrate.
3) A wettable powder, or a granular product label declares the percentage of actual insecticide in the package.
4) Thus, 1 lb actual malathion (Cythion) per acre is suggested in this publication for several insect pests. The emulsifiable concentrate contains 5 lbs of actual/gallon (57 percent product). Divide 1 by 5 = 0.2 gal needed/acre. Multiply 0.2 x 128 fluid ozs/gal = 25.6 fluid ozs (4/5 quart) of the concentrate needed with sufficient water for each acre. Each gallon of 5 lb/gal malathion is enough to mix with the amount of water needed to spray 5 acres at 1 lb actual per acre.
5) Also, if 1 lb actual carbaryl (Sevin) is listed for each acre, and it is an 80 percent wettable powder (each lb contains 0.8 lb actual), divide 1.0 by 0.8 = 1.25 lb of powder in sufficient water for each acre.
6) Or, if 3/4 lb actual carbofuran (Furadan) is listed for each acre of 40-inch rows, and it is a 10 percent granular product (each lb contains 0.1 actual), divide 0.75 by 0.1 = 7.5 lbs of the granules for each acre.

TABLE 3 MINIMUM INTERVAL BETWEEN LAST APPLICATION AND HARVEST

INSECTICIDE		APPLICATION TO DENT, SWEET OR POPCORN	
COMMON NAME	TRADEMARKED NAME	FOLIAGE	SOIL
- - - -	Bux		From planting to last cultivation time
carbaryl	Sevin	Up to harvest	
*carbofuran	*Furadan (dent corn only)	No more than two foliar applications	From planting to last cultivation time
chlordane	Belt		At planting only
*fensulfothion	*Dasanit		From planting to last cultivation time
diazinon	- - - -	Spray: up to harvest Granules: 10 days	From planting to last cultivation time
*disulfoton	*Di-Syston		40 days if for feed, 100 days if for food
- - - -	*Dyfonate	45 days	From planting to last cultivation time
- - - -	*EPN	14 days	
- - - -	Gardona	Food: up to harvest Feed: 5 days	
malathion	Cythion	5 days	
*methomyl	*Lannate or Nudrin	Food: up to harvest Forage: 3 days	
*parathion	- - - -	12 days	
*phorate	*Thimet	30 days before grazing or cutting for forage. If on foliage, dent corn only.	From planting to last cultivation time
trichlorfon	Dylox	Spray: 28 days Bait: 40 days	

Formulation types are indicated by letters: EC, Emulsifiable concentrate; G, Granules; L, Liquid suspension; SF, In starter fertilizer; SP, Soluble powder; ULV, Undiluted technical chemical used in ultra low volume spraying; WP, Wettable powder.

Insecticides are listed on the following pages in alphabetical order except where there is a preference. Starred (*) insecticides are to be handled and used only by individuals trained and equipped to do so.

Insecticides other than those listed may have federal and Wisconsin state registration for qualified safe use. These additional insecticides are not necessarily condemned, but most have not performed as well or are more hazardous to use than those listed.

Insect Control in Corn

Aphids, armyworms, common stalk borers, corn borers, cutworms, earworms, grasshoppers, rootworms, seed-attacking insects, shelled corn insects, white grubs and wireworms are the insect pests considered here. Regardless of row spacing, the same amount of pesticide is required per linear foot of row application to corn. Dosage rates per acre for row application are given for 40 inch rows. To figure dosage for other than 40 inch rows, divide the desired row width (in inches) into 40, and multiply by the dosage (lbs) per acre of actual insecticide for the 40 inch rows.

Example: 40 ÷ 30 = 1.33

1.33 x 1 lb phorate = 1.33 lbs actual phorate needed for 30 inch row.

Few insecticides can be applied up to time of harvest. Usually a time interval is specified to allow for insecticide breakdown prior to harvest. Minimum intervals (days or periods) between last application of recommended insecticide dosages and harvest of corn crops as specified by the USDA are listed in Table 3, p. 17. Failure to comply with these minimum intervals may result in illegal insecticide residues.

APHIDS

Aphids are dark green, soft-bodied 1/16 inch long and sometimes winged. They congregate on upper leaves and tassels and reduce ear development by sucking plant juices. Early planted corn suffers less from aphids. A single insecticide application should be made if 10 percent of the corn plants have 500 or more aphids per plant prior to tassel emergence (late July to very early August). Heavy populations commonly disperse by mid-August.

The following insecticides at the given dosages of actual insecticide per acre are suggested for aphid control.

diazinon EC or WP	1/2 lb/A
malathion (Cythion) EC	1 lb/A
*parathion EC	1/2 lb/A
*phorate (Thimet) G	1 lb/A

Diazinon, parathion or phorate applied earlier for corn borer control may make the corn leaf aphid less severe.

See pages 16 and 17 on formulations, dosages and time intervals before harvest.

ARMYWORMS

Armyworms are dark caterpillars measuring up to 2 inches long. They have a dark stripe running lengthwise on the side with a yellow stripe beneath. Dark and light stripes alternate along the back.

Armyworms move up from grassy weeds within corn fields or migrate from small grain, pea or forage fields. They may hide in soil crevices and beneath clods by day. At night, they chew corn leaves and weaken plants. If armyworms cause moderate to severe injury to a third or more of the corn plants, the entire corn field should be treated with one of the insecticides given below. When armyworms migrate into corn from adjoining areas, only a few border rows usually require treatment.

These insecticides at the given dosages of actual insecticide per acre are suggested for armyworm control on corn.

carbaryl (Sevin) WP	1 1/2 lb/A
malathion (Cythion) EC	1 1/4 lb/A
*parathion EC	1/2 lb/A

See pages 16 and 17 on formulations, dosages and time intervals before harvest.

COMMON STALK BORERS

These purplish to light brown worms with five stripes migrate from weedy borders to the outside rows of corn fields. No chemical control is suggested.

CORN BORERS

Corn borers are small white worms with black heads. They hatch from an egg mass on leaves and can grow to one inch. First generation borers feed on whorl leaves during early summer, making small holes which show as the leaves grow out. If uncontrolled, they also feed inside the stalk and ears. Second generation borers invade ears and hide behind leaf sheaths. They also enter the stalk and ear shank as they mature. Early planted corn suffers most from first generation borers while late planted corn is most susceptible to the second generation. Shredding and/or clean plowing of corn stalks in fall or spring before normal planting will reduce moth emergence and subsequent egg laying.

Recommendations for control of the first generation, in late June and in July, vary with the types of corn to be treated. For dent corn, make a single

insecticide application if 75 percent or more of the corn plants have egg masses or leaf feeding when 1,000 to 1,100 modified growing degree days have accumulated. The insecticide is best applied directly into the leaf whorl. Diazinon, parathion, or phorate may also make corn leaf aphids less severe.

With corn for canning or freezing, treat if and when 25 percent or more of the plants have egg masses or show leaf feeding. Apply the insecticide directly into the whorl and repeat after five days if more than one unhatched egg mass remains per ten corn plants. Treat fresh-market sweet corn when 10 percent or more of the corn plants have egg masses. Start plant examination for eggs by June 15. Start treatments at first hatching and repeat every five days as long as one or more unhatched egg mass remains per 10 corn plants. Four applications constitute a full program.

Second generation control in August is usually required for late planted sweet corn. Begin treatment when the first eggs hatch, if there is at least one egg mass per 10 corn plants. Repeat every five days as long as the indicated egg mass density lasts. One spray might be applied to field corn around mid-August if egg masses total more than one per plant.

The following insecticides and the given dosages per acre are suggested for corn borer control.

Insecticide	Amount per Acre
carbaryl (Sevin) WP, G	1 ½ lb/A
*carbofuran (Furadan) G[1]	1 lb/A
diazinon G	1 lb/A
*Dyfonate G[2]	1 lb/A
*EPN G, EC, WP	¼ lb/A
Gardona WP (employ only when multiple applications are used)	1 lb/A
*methomyl (Lannate or Nudrin) SP, L	0.45 lb/A
*parathion EC, G	½ lb/A
*phorate (Thimet) G[2]	1 lb/A

[1] carbofuran (Furadan) at 2 to 3 lbs actual per acre applied as granules at dent corn planting is labeled for first generation borer control

[2] first generation only

See pages 16 and 17 on formulations, dosages and time intervals before harvest.

CUTWORMS

Most cutworms are dark and range in size from very small to 2 inches. Several kinds feed on foliage or sever plants at or below ground level. Larger plants are hollowed. Early detection of cutworm feeding is important. Fields having more than 10 percent of the plants severely damaged should be treated with a postemergence insecticide. Spray the plants and adjacent soil about 6 inches on either side of the row. Insecticide bait may be applied broadcast by plane or cyclone spreader.

Spray:	
carbaryl (Sevin) WP, L	2 lbs/A
trichlorfon (Dylox) SP	1 lb/A
Bait:	
carbaryl (Sevin)	1 lb/A
trichlorfon (Dylox)	1 lb/A

EARWORMS

These vari-colored, smooth caterpillars are up to 2 inches long and feed mostly on ear tips. Insecticide treatment is necessary for very early market sweet corn and for late season canning or market sweet corn (silking after August 15), but is usually not worthwhile in field corn.

The following insecticides at the given dosages of actual insecticides per acre are suggested for earworm control.

carbaryl (Sevin) WP	1 3/4 lb/A
Gardona WP	1 1/8 lb/A
*methomyl (Lannate or Nudrin) SP, L	0.45 lb/A

See pages 16 and 17 on formulations, dosages and time intervals before harvest.

Ground applications should be made in 25 gallons of water per acre with at least 100 psi pressure. Two "wettable powder" nozzles should be directed at the silks from each side of the row. Aerial applications should be made in 4 to 5 gallons of water per acre.

Treat when 25 percent of the ears show silk. On whole kernel canning corn, follow with a second and third treatment. On fresh market sweet corn and cream-style canning corn, follow with a second, third and fourth treatment. Wait four to five days between treatments. Replace treatments after a significant rain. These treatments will also control corn borers hatching from eggs during this period. To protect small plantings of sweet corn, spray green silks with the above formulations applied with a small compressed air sprayer or dab 5 percent carbaryl dust on the green silks with a narrow brush. Repeat treatment every five days until silks are brown.

GRASSHOPPERS

Grasshoppers usually invade only a few outside rows of corn. Treating fence rows adjacent to corn fields may prevent severe injury.

The following insecticides at the given dosages of actual insecticides per acre are suggested for grasshopper control.

carbaryl (Sevin) WP	1 lb/A
diazinon EC, WP	1/2 lb/A
malathion EC	1 lb/A

See pages 16 and 17 on formulations, dosages and time intervals before harvest.

ROOTWORM LARVAE

Rootworm larvae are white with black heads and grow to 1/2 inch long. Northern and western rootworm larvae cannot be differentiated in the field. They feed on crown roots from June to August, causing corn to lodge and "gooseneck."

Rootworms are most serious in loam soils but of little consequence in muck or nonirrigated sandy soils. The larvae are not a potential problem unless corn is planted on the same ground in "rootworm areas" for two or more years in succession. Annual rotation provides automatic control of these insects.

Only Bux is labeled for preplant broadcast application. Granules or spray can be used at 4 pounds of actual insecticide per acre. Treat plowed ground and follow with harrowing or disking before planting.

Row treatment at planting is the most common method of applying insecticides for rootworm larvae control. Ranked in order of preference with dosages given for 40 inch rows, the suggested insecticides are:

*carbofuran (Furadan) G	3/4 lb/A (Dent corn only)
*phorate (Thimet) G	1 lb/A
Bux G, EC, SF	1 lb/A
*fensulfothion (Dasanit) G	1 lb/A
*disulfoton (Di-Syston) G, SF	1 lb/A
*Dyfonate G, EC, SF	1 lb/A

Row treatment at planting involves spreading insecticide granules or spray in a 7- inch band over the corn row in front of the packing wheel. Protection from crosswinds during granule application is important. Carbofuran (Furadan) also is approved for use in the seed furrow, but other products should be kept away from the seed. Starter fertilizer insecticide combinations should be placed at seed level to both sides (2 inches) of the corn row or delivered through a splitboot. Bux, disulfoton and Dyfonate suspend best in liquid starter fertilizer if you use a compatibility agent like "Compex".

For postemergence row treatment during mid-June, apply granules or spray to the base of corn plants and cover with cultivation soil. Diazinon EC, WP, or G, at 1 pound of actual insecticide per acre, or any of the planting-time insecticides are suggested. Carbofuran (Furadan) should not be used if already employed at planting. Only 10G formulation of Dyfonate is approved for cultivation treatment.

Cover spilled granules with soil to reduce chance of birds and mammals being poisoned.

See pages 16 and 17 on formulations, dosages and time intervals before harvest.

ROOTWORM ADULTS

The adult northern rootworm is yellow to green in color. The western species is yellow with three black stripes. Since rootworm adults congregate in ear tips to feed on silks, large populations in late July or early August can impair corn pollination. If there are five or more beetles per plant, corn fields should be treated before silks turn brown. Later appearing adults will not be killed and they may deposit enough eggs to cause significant larval damage the following year.

The following insecticides at the given dosages of actual insecticide per acre are suggested for control of adult rootworms.

carbaryl (Sevin) WP	1 lb/A
diazinon EC, WP	1/4 lb/A
malathion (Cythion) EC	1 lb/A

To minimize bee kill, silking corn should be sprayed in late afternoon.

See pages 16 and 17 on formulations, dosages and time intervals before harvest.

SAP (PICNIC) BEETLES

These black beetles with yellow spots often feed on corn kernels following invasion by corn borers, earworms, rootworm adults or birds. Insecticides suggested for their control, at the given dosage of actual insecticide per acre, are the following:

carbaryl (Sevin) WP	1 lb/A
malathion (Cythion) EC	1 lb/A

SEEDCORN MAGGOT AND BEETLES

Small white maggots, and 1/4 inch brown beetles attack planted corn seed and seedling plants underground. Holes in corn seedling leaves are usually made by these two insects, wireworms, cutworms, and a lesser degree by billbugs. The following seed treatment is suggested for control of maggot and seedcorn beetles.

Mix 2 to 2 1/2 ozs of actual diazinon with each 100 lbs of corn seed before placing it in the planter box (use special seed treating formulations containing graphite). Then check the planter to obtain the desired seeding rate. Planter plates should be cleaned frequently.

SHELLED CORN INSECTS

To minimize insect problems, storage bins and the immediate area around them should be cleaned and sprayed to the point of runoff with 1/2 pint of 57 percent EC malathion (premium grade) mixed in 2 gallons of water.

Brown, 1/16 inch to 1/8 inch bran bugs (beetles) and grain moth larvae may be noticed on the surface of stored corn. There is no standard fumigant to control these insects. Most of those available contain carbon tetrachloride plus either ethylene dichloride or carbon disulfide and possibly ethylene dibromide. Follow label directions carefully for correct application and precautions to protect the person doing the fumigation.

Where only Indian meal moth larvae are a problem, you can treat the shelled corn surface with 57 percent EC malathion (premium grade) at the rate of 1/2 pint in 2 gallons of water for every 1000 square feet of corn surface.

WHITE GRUBS AND WIREWORMS

Grubs are white, curved larvae up to 1 1/2 inch long which feed on the roots of grasses, including corn. Each generation takes three years to mature. Wireworms are slender, copper-colored, and take four to five years to mature. These insects are a problem primarily on fields coming out of sod or government programs.

Chlordane EC, WP or G is suggested for control. Use four pounds of actual insecticide for broadcast-incorporated treatment before planting. For row treatment during planting, granules or spray at 2 pounds of actual insecticide per acre, can be applied to the soil as it folds over the seed. Chlordane in liquid or dry starter-fertilizer should be delivered in two bands, one on each side of the corn row.

Carbofuran (Furadan) at 2 to 3 lbs. actual per acre is labeled for wireworm control. With the corn planter, apply as a 7 inch band on row or directly into seed furrow.

Insect Control in Soybeans

GREEN CLOVERWORMS, THISTLE WORMS AND GRASSHOPPERS

Green cloverworms and other green larvae appear on soybeans during July and August. Attack during pod filling is of most concern. At this time, treat beans if leaf defoliation approaches 20 percent. At 50 percent defoliation there will be a 20 percent yield loss. Disease and parasites kill many of the worms so a worm count alone (like 6/linear ft. of row) is not really indicative of potential damage.

Thistle worms are dark and spiny and hide in webbed foliage. They may attack young plants but their feeding is usually of little consequence.

Grasshopper control may be necessary only along fence rows. The following insecticides, at the given dosage of actual insecticide per acre, are suggested for the control of these three insects.

carbaryl (Sevin) WP	1 lb/A
malathion (Cythion) EC	1 1/4 lb/A

These insecticides may be used any time before soybean harvest so far as pesticide residues are concerned. They are hazardous to bees.

DISEASE CONTROL

Disease Control in Corn

In recent years diseases have had considerable impact upon the corn crop in the state. The emergence of several new diseases, together with some modified cultural practices and weather favorable to diseases have brought this about.

SELECTING RESISTANT VARIETIES AND GOOD CULTURAL PRACTICES

Corn diseases are most effectively and economically controlled by using resistant varieties. Take advantage of genetic or cytoplasmic resistance whenever it is available in varieties that otherwise fit into the agronomic needs of your crop, such as date of maturity and yield potential. Sometimes seed of resistant hybrids may be slightly more expensive. For instance, normal cytoplasm seedstock may cost $1.00 per acre more than comparable Texas male sterile cytoplasm (Tcms). However, that amount is a very small investment to make in providing good resistance to southern corn leaf blight (SCLB) and yellow leaf blight (YLB). Inquire of the seedsman, however, about the susceptibility of the varieties to SCLB and YLB, since a few varieties of normal cytoplasm did show infection to SCLB at damaging levels in 1972. No such problems were reported in 1973. Many normal cytoplasm-produced varieties showed some leaf spotting, but the amount was too low to cause damage.

Do not plant Tcms seedstock in Wisconsin. If it is necessary for you to plant blight susceptible varieties, restrict their use to upland fields with good air drainage, where corn debris from the previous crop has been thoroughly covered by plowing, or where corn does not follow corn in the rotation.

You should also inquire about the resistance of the variety to eyespot disease and northern corn leaf blight, two other foliage diseases. These diseases are equally severe on both normal and Tcms cytoplasm seedstock. Eyespot disease has been erratic in appearance and distribution in the state, causing substantial damage in the western half of the state in 1968. It has been present late in the season or in trace amounts every year since then, and caused locally heavy losses in 1972, where yields of certain infected plots were reduced by nearly 50 percent. All varieties may show some eyespot infection, but most early varieties are quite susceptible to the disease. Eyespot disease is potentially important in fields where considerable corn debris remains on the surface at planting time. Consequently, very susceptible varieties should not be grown on such sites, and early varieties in general may not be suitable for no-till continuous corn cropping. Use caution in selecting eyespot-tolerant varieties for such sites. Eyespot disease threat is a distinct disadvantage to no-till, continuous corn farming. However, it isn't a problem during dry years.

Many varieties have some tolerance to northern corn leaf blight (NCLB), which is a threat to corn fields in some years, especially in low lying fields in southwestern Wisconsin. In addition to a multiple gene resistance which imparts fair to good resistance in some varieties, the single "Ht" gene is being introduced into more varieties each year to provide an apparent high degree of resistance. The addition of this gene can be done to change a susceptible variety to a resistant form, while leaving the general agronomic characteristics of the variety unaffected. It is not necessarily a superior form of resistance to the multiple gene type, but it is easier for the plant breeder to incorporate in an established variety. Consequently, if your seedsman indicates that a formerly NCLB-susceptible variety is now resistant, this may be the reason. NCLB resistance is desirable throughout the state.

STALK ROT

Stalk rot is a very important disease that causes substantial losses each year through early plant kill and pre-harvest stalk-breaking. It causes premature death of some plants, fermenting or rotting stalks, and a discolored pith that weakens the stalk. Stalk rot is caused by a complex of fungal organisms that are particularly damaging to plants subjected to stress during the latter half of the growing season.

Complete control is difficult in favorable stalk rot years, but you can take several steps to reduce the problem: (1) select varieties that stand the best under your system of farming; (2) maintain a high level of potassium in accordance with soil test recommendations; (3) control blight diseases, for they cause early leaf kill and increase susceptibility to stalk rot; (4) grow full season corn varieties where possible, as early maturing varieties generally suffer more from stalk rot; (5) harvest as early as practical to prevent greater losses from stalk-breaking; (6) consider other methods of keeping the plant free from stress during the growing season, such as controlling leaf feeding insects and borers, and irrigating during drouthy conditions where possible. Also, avoid unprofitably high population levels and excessive applications of nitrogen, as both of these stresses increase stalk rot severity.

LEAF BLIGHT CONTROL WITH FUNGICIDES

The recent blight years have necessitated considering control by use of protectant fungicides. SCLB, YLB, NCLB and eyespot severity can be effectively reduced by foliar or leaf fungicide applications, though using resistant varieties is more desirable and economical where possible. Some seed production fields and a few commercial fields could have benefited from treatment in 1972. Blight infection was much reduced in 1973, though isolated seed fields showed damage from NCLB. Should any of these blights threaten during the period between tasseling and dent (about 35 days), treatment may be economical. It usually isn't practical to apply chemical at earlier or later stages, in our judgment. Chocolate spot, a bacterial disease of occasional severity (where K levels are low), does not respond to fungicide treatment.

Apply 1 1/2 pounds of Dithane M-45 or Manzate 200, along with a spreader sticker, in 3 to 5 gallons of water per acre if applied by air, or 10 to 20 gallons per acre if applied by hi-boy ground rig equipment. Note: recent restrictions prevent its use on any corn crop within 40 days of harvest. Zineb is also registered, but has the same waiting period and is not considered as effective. Citcop, a copper-containing fungicide, is registered for SCLB control and has no waiting restrictions, but has not been evaluated in Wisconsin.

Consider the following factors before deciding to apply a foliar fungicide:

1) The susceptibility of the crop to the disease or diseases which threaten. Nearly all N-cytoplasm hybrid seedstocks are sufficiently resistant to SCLB and yellow leaf blight. But some normal cytoplasm inbreds in seed production fields may need fungicide treatment under severe disease conditions. Varieties differ in susceptibility to NCLB and eyespot; those known to be quite susceptible should be examined periodically for blight buildup, especially after tasseling. A recently discovered leaf blight, called northern corn leaf spot, has caused some damage in certain normal inbreds in seed production fields.

2) The anticipated severity of the disease. In addition to susceptible varieties, leaf blights also require wet growing conditions to develop. Severe disease development is not likely to occur until after tasseling. Consequently, wet weather or continued heavy dews in August signal possible blight problems. Low lying fields and those under irrigation are especially susceptible. Know varietal reactions, examine the crop for evidence of disease buildup, and watch weather patterns closely the month after tasseling to assess potential severity. Note: If the blight has already invaded much leaf surface above the ear, treatment benefits will be minimal.

3) Treatment cost versus expected benefit. Each treatment costs about $3.00 to $3.50 per acre for the chemical, wetting agent and application. At least two applications are needed if the disease warrants spraying, and three or four may be required. Moreover, the treatments reduce but do not eliminate disease loss. Consequently, only consider fields with high yielding potential for treatment. Blight-threatened seed fields are more likely to benefit than commercial fields. Weigh costs against anticipated price of the crop and expected yield.

4) Availability of competent commercial applicators and equipment. Applicators must know how to apply fungicides for maximum effectiveness. Spray droplets should be 1/64 to 1/128 inch in size and scattered as uniformly as possible over the leaf surface. Nozzle selection, placement, pressure and gallons per acre influence successful treatment. Special instructions are available for applicators. See publication A2247, "Corn Leaf Diseases in Wisconsin" (C687), to help identify blight diseases.

Disease Control in Soybeans

With the exception of occasional seed treatments, soybean disease control measures utilize cultural practices and resistant varieties, rather than chemical means.

SOYBEAN SEED TREATMENTS

Seed treatment is rare for soybeans, but may be beneficial under the following conditions:

--If it is desirable to use a minimum planting rate of high germinating seed.

--If there is an excessive number of cracked seed coats, as may occur under dry harvesting conditions.

--If germination is below 80 percent or there are other indications of low seed vigor. Old seed, or seed which may have been invaded by disease-producing organisms is more likely to respond to seed treatment.

--If the field is known to be heavily infested with soybean root invading organisms such as Pythium, Rhizoctonia or Phytophthora.

Where one or more of these conditions exist, using a seed treatment formulation of captan or thiram may be desirable. Follow directions on the label, which usually specify 2 ounces per bushel of seed. Apply the seed treatment before treating with inoculum, especially if planting on a field where soybeans have not been grown previously. Apply inoculum just before planting.

RESISTANT VARIETIES

A few more Wisconsin soybean fields showed Phytophthora root rot infection in 1973, so you should be shifting to resistant varieties in areas where the disease is known to occur. Fields in southern or eastern Wisconsin with heavy soil and a tendency for poor drainage are especially prone to Phytophthora problems.

Phytophthora-resistant varieties are available from seed companies and are expected to perform satisfactorily in 1974. Reports from other mid-western states forewarn that a new strain of the pathogen has emerged, which may eventually threaten our resistant varieties.

CULTURAL PRACTICES

Selection of quality seed and crop rotation are two cultural practices that reduce chances for serious soybean disease development. Seed that is low in vigor, whether due to such factors as physical injury, poor storage, aging, or disease infection, is more susceptible to damage by damping-off fungi than high quality seed. Don't harvest seed from weathered or badly infected fields. Dry seed carefully and promptly and store under good conditions. Consider vigor, as well as germination of seed, in selecting seed whenever possible.

Crop rotation and fall plowing of soybean fields where possible to hasten decay of infested stubble are effective means of controlling stem canker, pod and stem blight and several foliage diseases.

PESTICIDE USE

Calibrating Sprayers and Granular Applicators

Accurate and uniform pesticide application is basic to satisfactory pest control. Too frequently a grower does not know exactly how much pesticide has been used until the application is completed. Good pesticide application begins with accurate sprayer or granular applicator calibration. Several methods are available. One rapid and satisfactory method is outlined in publication A1658, "Sprayer and Granular Applicator Calibration" (C540).

Corn planter granular applicators can be calibrated by opening the feed adjustment as suggested by the manufacturer and catching the granules from one discharge tube or tube attachment while driving 200 feet. Collecting 60.4 grams or 2.45 ounces in this distance is equivalent to 10 pounds per acre of formulated granules on 40-inch corn rows. As corn rows are narrowed, the same **rate** per linear foot needs to be maintained.

Cleaning Sprayers

Thorough sprayer cleaning is usually necessary when switching from pesticide application on one crop to the application of a different pesticide on another crop. This is especially important when the second crop is quite sensitive to the first pesticide. For example, residue of 2,4-D left in a sprayer may damage soybeans and other 2,4-D sensitive crops during subsequent insecticide application. If significant quantities of different types of pesticides are to be applied, it's advisable to have one sprayer for herbicides only; and another for insecticides and fungicides.

To clean the sprayer, first drain it of all pesticide and flush it thoroughly with clean water. Then:

1) Fill the sprayer to capacity with water adding one cup of trisodium phosphate or household ammonia for each 10 gallons of water. If neither is available, use a strong soap suds.
2) Thoroughly wash the tank and pump parts by running the sprayer for about five minutes with nozzles closed.
3) If possible, let the cleaning solution stand in the sprayer overnight.
4) Discharge the liquid from the tank, spraying some through the nozzles.
5) Drain the sprayer completely.
6) Scrub strainers and other accessible parts with a stiff bristle brush.
7) Rinse the sprayer thoroughly with clean water.

Safe Pesticide Use

Herbicides and insecticides are not likely to injure humans, domestic animals or wildlife when properly used according to recommended precautions. The best general advice for safe use is found on product labels. However, crosscheck with current University of Wisconsin-Extension recommendations for possible changes since the particular label was approved. Suggestions and warnings should be carefully followed. To help insure safe use:

1) Store all pesticides in closed, original labeled containers, separate from food, feed, seed and fertilizer and out of reach of children and pets. If possible, store herbicides separately from insecticides and fungicides.
2) Dispose of empty containers by breaking them and burying them at least 18 inches deep in an isolated area away from water supplies, preferably in a licensed sanitary landfill.
3) Don't drain or flush spray equipment near desirable vegetation or domestic, irrigation, and other waters.

POISON CONTROL AND TREATMENT CENTERS

Most pesticide labels give first aid information regarding pesticide poisoning through accident or negligence. When consulting a medical doctor about poisoning treatment, take the entire label to him for guidance.

There are several Poison Control and Treatment Centers in and near Wisconsin where medical doctors can get immediate information on treatment of poisoning by specific pesticides. Patients might also be referred to treatment centers by their local doctors. See the back page for the list of these centers.

POISON CONTROL CENTERS

Poison Control Centers are hospitals so designated by the Department of Health and Social Services because they have an accumulation of reference materials including index cards furnished by the National Clearinghouse for Poison Control Centers. These Centers are staffed and equipped to provide 24-hour-a-day information on ingredients of potentially toxic substances and to recommend and provide treatment.

POISON TREATMENT CENTERS

Poison Treatment Centers are hospitals having some reference materials, but not the index cards furnished by the National Clearinghouse for Poison Control Centers. These hospitals provide readily available drugs, antidotes and equipment necessary for the treatment of poisoning.

Some pesticides listed in this publication are referred to by trademarked name for consumer convenience. Persons using treatments described herein assume full responsibility for their use in accordance with current label directions of the manufacturer.

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This publication was slightly revised January, 1974.

WISCONSIN HOSPITALS QUALIFYING AS POISON CONTROL OR POISON TREATMENT CENTERS

POISON CONTROL CENTERS

Eau Claire	Luther Hospital
Green Bay	Bellin Memorial Hospital
Kenosha	Memorial Hospital
Madison	University Hospitals
Milwaukee	Children's Hospital

POISON TREATMENT CENTERS

Amery	Apple River Valley Memorial Hospital
Appleton	St. Elizabeth Hospital
Arcadia	St. Joseph's Hospital
Ashland	Community Hospital
Ashland	Trinity Lutheran Hospital
Baldwin	Community Hospital
Beaver Dam	Lutheran Hospital
Beaver Dam	St. Joseph's Hospital
Beloit	Memorial Hospital
Berlin	Memorial Hospital
Boscobel	Memorial Hospital
Burlington	Memorial Hospital
Chilton	Calumet Memorial Hospital
Chippewa Falls	St. Joseph Hospital
Cudahy	Trinity Memorial Hospital
Cumberland	Memorial Hospital
Dodgeville	General Hospital
Durand	St. Benedict Community Hospital
Eau Claire	Sacred Heart Hospital
Edgerton	Memorial Community Hospital
Elkhorn	Lakeland Hospital
Fort Atkinson	Memorial Hospital
Frederic	Municipal Hospital
Friendship	Adams County Memorial Hospital
Green Bay	St Mary's Hospital
Green Bay	St. Vincent Hospital
Hillsboro	St. Joseph's Memorial Hospital
Hudson	Memorial Hospital
Iola	Iola Hospital
Kaukauna	Community Hospital
Kenosha	St. Catherine's Hospital
Kewaunee	St. Mary's Memorial Hospital
La Crosse	Lutheran Hospital
La Crosse	St. Francis Hospital
La Crosse	Gunderson Clinic
Lancaster	Memorial Hospital
Madison	Madison General Hospital
Madison	Methodist Hospital
Madison	St. Mary's Hospital
Manitowoc	Holy Family Hospital
Manitowoc	Memorial Hospital
Marinette	General Hospital
Medford	Memorial Hospital
Menomonee Falls	Community Memorial Hospital
Menomonie	Memorial Hospital and Nursing Home
Merrill	Holy Cross Hospital
Milwaukee	Columbia Hospital
Milwaukee	Johnston Municipal Hospital
Milwaukee	County General Hospital
Milwaukee	St. Joseph's Hospital
Milwaukee	St. Luke's Hospital
Milwaukee	St. Mary's Hospital
Milwaukee	St. Michael's Hospital
Neenah	Theda Clark Memorial Hospital
Neillsville	Memorial Hospital
New London	Community Hospital
Oconomowoc	Memorial Hospital
Oconto	Memorial Hospital
Oconto Falls	Community Memorial Hospital
Oshkosh	Mercy Medical Center
Park Falls	Memorial Hospital
Platteville	Municipal Hospital
Port Washington	St. Alphonsus Hospital
Prairie du Chien	Memorial Hospital
Prairie du Sac	Memorial Hospital
Racine	St. Luke's Hospital
Racine	St. Mary's Hospital
Reedsburg	Memorial Hospital
Rhinelander	St. Mary's Hospital
Rice Lake	St. Joseph's Hospital and Nursing Home
Richland Center	Richland Hospital
Ripon	Memorial Hospital
Shawano	Community Hospital
Sparta	St. Mary's Hospital
Spooner	Community Memorial Hospital and Nursing Home
St. Croix Falls	Memorial Hospital
Stanley	Victory Memorial Hospital
Stevens Point	St. Michael's Hospital
Stoughton	Community Hospital
Sturgeon Bay	Door County Memorial Hospital
Superior	St. Joseph's Hospital
Superior	St. Mary's Hospital
Tomah	Memorial Hospital
Two Rivers	Municipal Hospital
Viroqua	Vernon Memorial Hospital
Waukesha	Memorial Hospital
Wausau	St. Mary's Hospital
Wausau	Memorial Hospital
Wautoma	Memorial Community Hospital
West Allis	Memorial Hospital
Whitehall	Tri-County Memorial Hospital
Wisconsin Rapids	Riverview Hospital

COUNTY EXTENSION OFFICES

In every Wisconsin county University of Wisconsin–Extension office faculty members are ready to serve you with information and educational programs. Each of these faculty members has the key to research information and the resources of your new University of Wisconsin system, the United States Department of Agriculture, and other federal agencies. You may contact the University of Wisconsin–Extension faculty members in any of the offices shown on this map.

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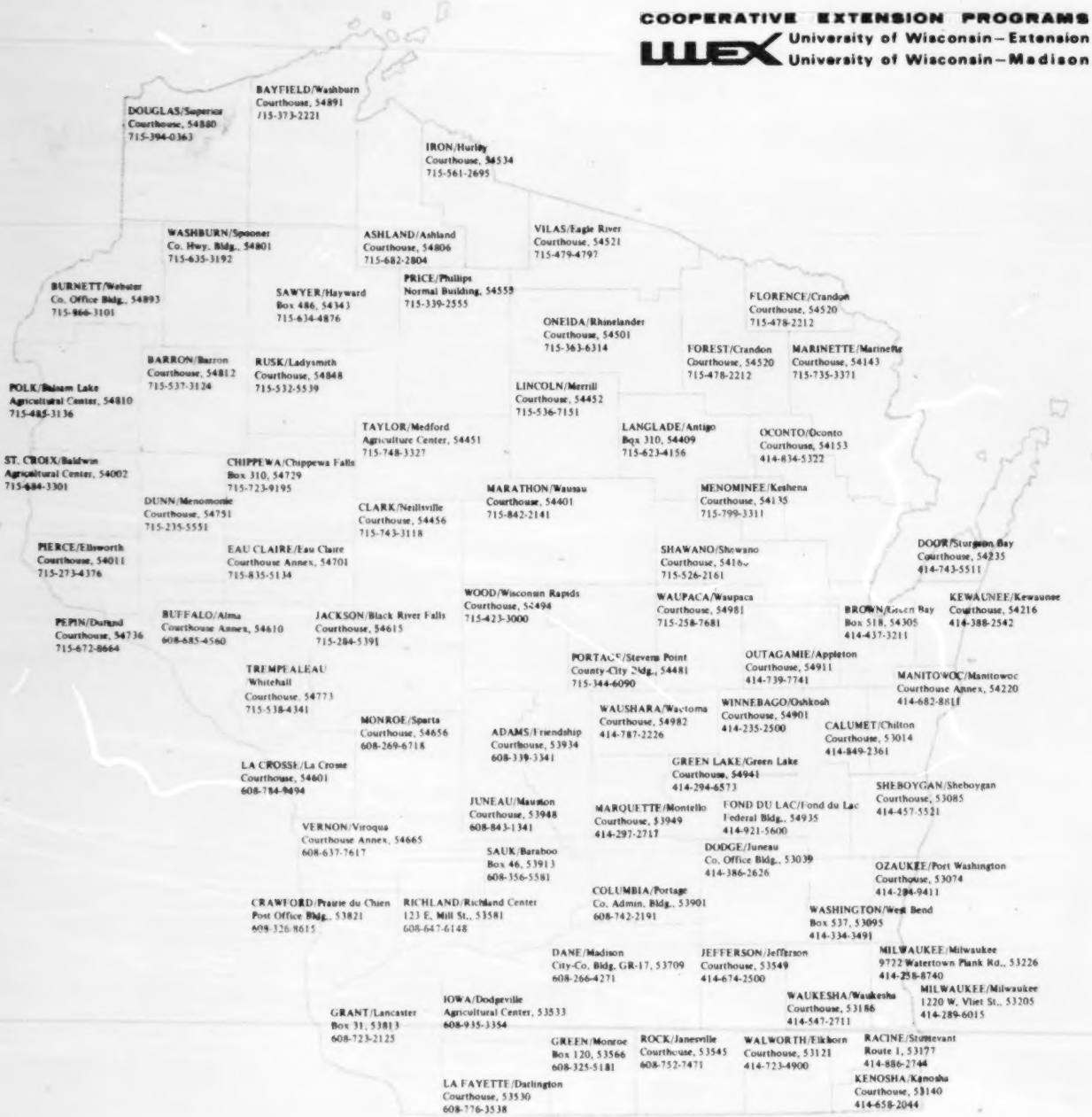

University of Wisconsin–Extension, Gale L. VandeBerg, director, in cooperation with the United States Department of Agriculture and Wisconsin counties, publishes this information to further the purpose of the May 8 and June 30, 1914 Acts of Congress; and provides equal opportunities in employment and programming. This publication is available to **Wisconsin residents** from county Extension agents. It's available to **out-of-state purchasers** from Agricultural Bulletin Building, 1535 Observatory Drive, Madison, Wisconsin 53706. **Editors,** before publicizing, should contact the Agricultural Bulletin Building to determine its availability. Price twenty five cents plus postage.

13000-13-3J30119